Notes.

THE Albert medal of the Royal Society of Arts for 1921 has been awarded to Prof. J. A. Fleming in recognition of his many valuable contributions to electrical science and its applications, and especially of his original invention of the thermionic valve, now so largely employed in wireless telegraphy and for other purposes.

NOTICE is given by the University of London that the advanced lectures by Prof. A. D. Waller and Mr. J. C. Waller on "Experimental Studies in Vegetable Physiology and Vegetable Electricity," announced for delivery on June 15, 22, 29, and July 6, cannot now be given.

THE Importation of Plumage (Prohibition) Bill, as amended in Standing Committee, was read a third time in the House of Commons on June 10.

THE grant of 5000*l.* a year promised by the Government for five years to the Empire Cotton Growing Corporation (on condition that 90 per cent. of the cotton industry should agree to contribute by means of a voluntary levy on every bale of cotton imported into England, which agreement has now been obtained) is to be replaced by the grant of a capital sum of 1,000,000*l.* to the corporation. This announcement was made by Mr. Winston Churchill in Manchester on June 7. The capital sum in question is about a quarter of the total profits made by the British and Egyptian Governments from their joint control of the cotton supply during the war. These profits are being shared equally between the two Governments, and half the British Government's share is to be utilised for the promotion of Empire cotton.

THE Minister of Agriculture has announced the gift to the nation by Lord Lee of a large estate of 1300 acres, being part of the Chequers estate, of which 700 acres is farmland and the remainder woodland. The Ministry proposes that the main farm should be conducted as an example of the stock-rearing farm, showing how land of that character could be improved so as to produce the maximum output of livestock consistent with sound commercial agriculture. It is considered that the farm could be made a valuable demonstration of the growth and value of improved varieties of cereals and fodder crops and of the amelioration of grassland to be utilised for the intensive breeding and rearing of livestock, without departing from the prime economic purpose of any farm which is intended to guide the practice of the working farmer. At the same time it is hoped to come to some arrangement with the Bucks County Council, under which the Dropshort Farm could be utilised for more definitely educational purposes as the holding attached to a farm institute. It is a hopeful augury, and one not without significance, that future Prime Ministers should be able to see at their doors an example of agricultural education in being. Lord Lee's munificent donation adds to the debt of gratitude which the nation already owes him, and gives the agricultural authorities an opportunity of carrying out work which has long been needed, and which they have long desired to do.

THE fifth International Rubber Exhibition was opened on June 3 by Sir Owen Philipps, M.P., at the Royal Agricultural Hall, Islington. Notable exhibits of rubber and other tropical produce were shown by commercial firms and by British overseas and foreign Governments, the colonial exhibits of the latter being particularly good. From the scientific point of view the display illustrating the mycological work which is being carried out under the auspices of the Rubber Growers' Association, and the fine exhibit of the Java rubber research stations, call for special mention. The most important feature of the exhibit of the Rubber Growers' Association was the effectively arranged demonstration of the discovery by the Botany Department of the Imperial College of Science and Technology that, in all probability, "brown bast" (the most serious disease of *Hevea brasiliensis*) is essentially a question of phloem necrosis. Sanderson and Sutcliffe (the latter a former student of the college), in their investigation of the anatomy of burr-formation, which is the principal external symptom of brown bast, had shown that the burrs result from the inclusion of areas of diseased laticiferous tissue in stone-cell "pockets" formed by the activities of wound cambiums. The recent work at the Imperial College, however, focusses attention upon the probability that the disease has its origin in an affection of the sieve-tubes (phloem), the symptoms described by Sanderson and Sutcliffe being a secondary development. The important information now available should be a step forward to the discovery of the causative factors of this baffling disease. Another series of preparations demonstrated the action of certain fungi (Diplodia, Nectria, and Fusarium) as wound parasites; cultures of fungi obtained from Hevea trunks were also shown. A further exhibition of the department comprised a series of seed-germination experiments, which showed that rubber seed which had failed to germinate was already infected with Diplodia, a fungus known to cause a disease of Hevea seedlings. Reference must also be made to the interesting exhibit illustrating the course of instruction in rubber technology which is being conducted at the Northern Polytechnic Institute, Holloway.

THE British Cast-Iron Research Association has been approved by the Department of Scientific and Industrial Research as complying with the conditions laid down in the Government scheme for the encouragement of industrial research. The secretary of the association is Mr. Thomas Vickers, Central House, New Street, Birmingham.

AT the anniversary meeting of the Linnean Society of London, held on May 24 last, the following officers were elected :—*President:* Dr. A. Smith Woodward. *Treasurer:* Mr. H. W. Monckton. *Secretaries:* Dr. B. Daydon Jackson, Prof. E. S. Goodrich, and Dr.

A. B. Rendle. *Members of Council:* Prof. Margaret Benson, Prof. V. H. Blackman, Mr. E. T. Browne, Mr. H. Bury, Mr. S. Edwards, Prof. E. S. Goodrich, Dame Helen Gwynne-Vaughan, Sir Sidney F. Harmer, Dr. B. Daydon Jackson, Mr. C. C. Lacaita, Mr. G. W. E. Loder, Mr. H. W. Monckton, Mr. R. I. Pocock, Capt. J. Ramsbottom, Dr. A. B. Rendle, Lord Rothschild, Dr. E. J. Salisbury, Mr. C. E. Salmon, Mr. Thomas A. Sprague, and Dr. A. Smith Woodward.

THE nineteenth annual meeting of the South African Association for the Advancement of Science will be held at Durban on July 11–16, under the presidency of Prof. J. E. Duerden, of Rhodes University College, Graham's Town. As in previous years, the association will meet in six sections, the presidents of which are as follows:—Section A (Astronomy, Mathematics, Physics, Engineering, etc.), Dr. J. Lunt, of the Royal Observatory, Cape of Good Hope; Section B (Chemistry, Geology, Geography, etc.), Dr. J. Moir, Chemist to the Mines Department, Johannesburg; Section C (Botany, Forestry, Agriculture, etc.), Prof. J. W. Bews, of Natal University College, Maritzburg; Section D (Zoology, Physiology, Hygiene, etc.), Prof. H. B. Fantham, of University College, Johannesburg; Section E (Anthropology, Philology, etc.), Dr. C. T. Loram, of the Natal Education Department; and Section F (Education, Sociology, History, etc.), Prof. W. A. Macfadyen, of Transvaal University College, Pretoria. The general secretaries of the association are Dr. C. F. Juritz, Department of Agriculture, Cape Town, and Mr. H. E. Wood, Union Observatory, Johannesburg. Capt. H. A. G. Jeffreys, P.O. Box 6894, Johannesburg, is acting as assistant general secretary. It is announced that the 1922 meeting will be held at Lorenço Marques under the presidency of Dr. A. W. Rogers, Director of the Geological Survey of the Union of South Africa.

EVIDENCE of considerable interest in relation to the character and distribution of Iron-age culture in the Balkan Peninsula has been obtained by Mr. Stanley Casson in the course of a journey through parts of Macedonia. This journey was undertaken under the auspices of a research committee, of which Sir William Ridgeway is chairman, of the British Association, appointed to excavate early sites in Macedonia. Starting from Dedeagatch, the port at the mouth of the Maritza River, Mr. Casson worked westward through Enos, Drama, and Cavala. He also visited Vodena and Ostrovo. Excavations were undertaken at Chauchitsa, which during the war was one of the railheads on the British Doiran-Vardar front. The "finds" included bronze ornaments, pottery, some gold, and a number of iron knives. The results of Mr. Casson's investigations of this area, of which little is known archæologically, will be described in full in the Anthropological Section at the Edinburgh meeting of the British Association in September next.

THE lectureship established to commemorate the work of Mr. Moncure Conway was held this year by Dr. A. C. Haddon, who selected as his subject "The Practical Value of Ethnology." After a preliminary survey of the relations of sociology and history to anthropology, Dr. Haddon proceeded to discuss the relations of peoples of the higher to those of the lower culture under the heads of Conduct, Control, and Care. In regard to "conduct," he urges that dealings between groups, as well as those between individuals, should be conducted with the greatest possible consideration for their several sentiments and prejudices. Under the head "control" he considers the value of the knowledge of anthropology to the statesman and administrator. By "care" he means the efforts which can be made to check the evil results which arise from the contact of the higher with the lower civilisation in the prevention of epidemics, the problem of the dying-out of native races, the avoidance of meddlesome interference, and so on. Problems of this kind are familiar to all ethnologists, but Dr. Haddon's exposition of the subject is admirable, and it is illustrated by an interesting selection of facts drawn from his wide knowledge of anthropological literature and practical experience as a traveller. The lecture deserves the careful attention which it is sure to receive from all who are interested in the advance of our common humanity.

AN interesting phase of the social life of Roman society in the Ciceronian age is described by Messrs. A. W. Van Buren and R. M. Kennedy in a paper contributed to the *Journal of Roman Studies* (vol. ix., part 1) on Varro's aviary at Casinum. Marcus Terentius Varro, author of the famous work on agriculture, "De Re Rustica," gives a long account of this building, which is here quoted and translated. It contained fish-ponds and duck-houses, the latter enclosed by fine gut nettings, and spaces shut off by nets for songsters, such as nightingales and blackbirds, supplied with water by means of a small channel, while food was thrown to them under the net. Several of the elements which enter into the arrangement of Varro's aviary recur in a contemporary Pompeian painting from the villa of Julia Felix.

THE American Museum of Natural History has set a good example in founding a new journal for the publication of preliminary announcements and the description of new species. It is to be known as the *American Museum Novitates.* No. 1, which has just reached us, is devoted to an extremely interesting and stimulating survey of the evolution, phylogeny, and classification of the Proboscidea by Prof. H. F. Osborn, who within the compass of a few pages has provided food for thought and much debate for some time to come. All interested in palæontology will note with satisfaction that the author frankly rejects his earlier views in regard to Mœritherium, and subscribes to the opinion originally started by Dr. C. W. Andrews, of the British Museum, that it is to be regarded as an indubitable proboscidean. But they will probably fail to grasp the precise meaning of the author's contention that "the enlargement of the second upper and lower incisor teeth . . . presents a firm ground of affinity with a still unknown primitive Lower Eocene proboscidean-stem form. There the resemblance ends." We venture to think that when Prof. Osborn's studies of this remarkable fossil are completed he will still further modify his conception as to the ancestral position of this animal, when the system of proboscidean classification proposed in this essay will be materially changed.

THE annual report of the Smithsonian Institution for the year ending June, 1918, contains as usual, in addition to the secretary's report, a valuable general appendix consisting of twenty-seven papers illustrating the more important developments in physical and biological science, among them being translations of contributions by foreign men of science. In one of these, "On the Law of Irreversible Evolution," Dr. Branislav Petronievics sets forth an exposition based on Lewis Dollo's own works of the principle that "an organism cannot return even in part to a previous condition already passed through in the series of its ancestors." Another translation is "The Fundamental Factor of Insect Evolution," by S. S. Chetverikov—a paper which was first published in Russian. The opposite direction of the paths of evolution of vertebrates and invertebrates is accounted for by assuming that the chitinous skeleton of insects enabled them to diminish continuously the size of the body and so to obtain for themselves an independent place among terrestrial animals while increasing in endless variations of form. The third translation included in the volume is "The Psychic Life of Insects," by E. L. Bouvier—a paper in which the author attempts to show that the predominance of instinctive activity among insects is due to the multiplicity of appendages, and that, in consequence, their main psychical task consists in engraving on their memory and in repeating instinctively the acts to which these organs are adaptable.

EXCELLENT photographs of the skull, mandible, cervical vertebræ, and fore and hind feet of the giant extinct marsupial Nototherium, found last year at Smithton, Tasmania, are published by Messrs. H. H. Scott and Clive E. Lord in their account of the specimen, which is now in the Tasmanian Museum, Hobart (Proc. Roy. Soc. Tasmania, 1920). Nototherium seems to have borne a dermal horn on the nose, and may have played the part of a rhinoceros in the marsupial fauna of the Australian region. Its feet, however, are peculiar, and closely resemble those already known in Diprotodon. Messrs. Scott and Lord discuss these features specially, but their use of English words and their style of composition are so unfamiliar that it is difficult to grasp their meaning.

IN the *Brooklyn Museum Quarterly* for January, Mr. R. C. Murphy, the curator of natural history, continues his account of "The Sea-coast and Islands of Peru," dealing here with the Chincha Islands, and including a narrative by Dr. F. A. Lucas, who spent three months there on a guano ship in 1869.

PART 2 of the Quarterly Journal of the Geological Society for 1920 (vol. lxxvi.) is occupied by palæontological papers. Mrs. Eleanor Mary Reid describes two pre-Glacial floras from beneath the Boulder Clay of Castle Eden, on the Durham coast. By a careful comparison with French and Dutch deposits, the author assigns one to the Middle and the other to the Upper Pliocene. She follows with "A Comparative Review of Pliocene Floras based on the Study of Fossil Seeds," the inspiration for which came from the work carried on by herself and her husband, the late Mr. Clement Reid, between 1904 and 1915. The general conclusion is that at the opening of Pliocene times a flora existed in western Europe which was closely allied to the living floras of far-eastern Asia and of North America; but this gradually disappeared, until, in the Upper Pliocene bed of Cromer, it was represented by only 0·74 per cent. of the plants examined. The succession of the floras is Pont de Gail (Cantal), which is practically Miocene; Reuverian (from Reuver, north-east of Roermond, Holland); Castle Eden (Durham); Teglian (from Tegelen, on the Meuse, south of Venlo, and north-east of Reuver, in Holland); and Cromerian (Norfolk). In the same issue of the journal Dr. F. J. North publishes a detailed study of the brachiopod genera Syringothyris and Spiriferina, which he finds to be unrelated. He establishes a new genus, Tylothyris, for McCoy's *Spirifera laminosa.*

IN a paper on "The Nature of Palæozoic Crustal Instability in Eastern North America" (*Amer. Journ. Sci.*, vol. l., p. 410, 1920) Dr. C. Schuchert connects considerable epochs of diastrophism with the close of geological periods. He urges that the latter are determined by changes of fauna, and the "quickened evolution of the earth's plants and animals" is a response to altered conditions of the surface. Hence the unconformities after epochs of disturbance, such as the "Nevadian" epoch of mountain-building at the close of the Jurassic period, which affected the whole region from Lower California to Alaska, may fairly be taken as stratigraphical boundaries. It may be remembered that similar reasoning was put forward by Prof. T. C. Chamberlin in the *Journal of Geology* for 1909. Dr. Schuchert hesitates, however, at closing the Mesozoic era in America with the top of the Jurassic, and it is obvious that a review of the contemporary faunas throughout the world is necessary for a reasonable delimitation of the groups and systems.

THE utilisation of the artesian water resources of Western Australia is making progress. An article on the subject by Mr. A. G. Maitland appears in the Mining Handbook (Geological Survey Memoir, No. 1) issued by the Minister of Mines. Mr. Maitland maps the location of five artesian basins in Western Australia which vary much in size and importance. Most significant, as bearing on the pastoral possibilities of the State, is the so-called desert basin in the north-west covering the area usually known as the great sandy desert. The disposition of the rocks gives ideal artesian conditions, the water being, in the main, derived from the rainfall of the Kimberley district. The six or seven bores which have been sunk in this desert area have been sufficiently successful to give high promise for further operations. North of the Great Australian Bight artesian conditions seem to be favourable in the Eucla basin, but more investigation is required. In five out of thirteen bores the water rose freely.

AT the request of the American Geographical Society, Sir John Scott Keltie has prepared a short report on "The Position of Geography in British Universities" (Research Series No. 4). Sir John Keltie, in addition to giving some details for each university, reviews briefly the history of geographical education in Great Britain, and shows that considerable progress has been made in this country since his well-known report on the subject in 1885. At that date geography was practically unrecognised in British universities, while at present there are only two universities in England and one in Scotland in which there is no separate department in geography. Despite this progress, much remains to be done. In many universities the departments are understaffed, and the subject has a hard, and not always successful, fight to find its due place in the curricula. There is diversity of opinion regarding the scope of the subject and methods of treatment. In a few universities the subject is in both the faculties of arts and sciences, but in some it is only in arts. The addition of degrees in commerce has resulted in increased demand for geography, but on somewhat restricted lines, which cannot do justice to the subject. Sir John Keltie thinks there is need for geography to limit the field of its operations and to avoid the embarrassment of overcrowding.

THE Ministry of Finance, Egypt, has recently issued a Blue Book embodying the programme and policy of the Egyptian Government in regard to the development of the oil resources of that country. The chief point of interest in the publication is the defence put forward by the Under-Secretary of State for Finance, Mr. E. M. Dowson (under whose name the book appears), in support of the policy of State boring for oil determined upon in 1919. In other words, the justification of the expenditure of public money on petroleum mining in Egypt is pleaded in view of the growing scarcity and enhanced price of oil fuel as a measure of internal economy and as an attempt to further the scientific development of the oil resources of the country. State enterprise in such a risky business as oil-finding is usually to be deplored, but there are certain factors to be recognised in the political elements here engendered which not only warrant some co-ordinated efforts to deal with a difficult situation, but also make it essential that some authoritative scheme should be adopted to stabilise the oil industry of the country. The present policy includes the reservation of certain likely petroliferous areas for the Government as a result of a preliminary geological survey; such areas include Abu Durba, the west coast of Sinai, several isolated areas in northern Sinai, two smaller areas on the west coast of the Gulf of Suez at Ras Dib and Zeit Bay, and a larger area at Abu Sharr adjoining the better-known Hurghada field. The location of a commercially productive field in any one of these areas would justify, at any rate from a Government point of view, all the expenditure entailed in obtaining, transporting, refining, and distributing the oil. Failure, on the other hand, will be severely criticised, not only at home in Egypt, but also abroad. The scientific results accruing from the borings, however, must have considerable value in the task of assessing the oil potentialities of the country, but ultimately it will be for the Egyptian people to pass judgment on a policy the merits or demerits of which as yet remain to be substantiated.

IN the *Radio Review* for May Mr. T. L. Eckersley concludes his inquiry as to whether the errors in the apparent bearings of radio stations from which messages are received at night can, in whole or in part, be explained by the existence in the atmosphere of an outer conducting layer which he calls "the Heaviside layer," at the under-surface of which the electric waves are reflected. He thinks that the existence at night of such a reflected wave-train must now be taken as proved, and proposes to determine by measurement whether there is any component of the electric force horizontal and perpendicular to the plane of propagation. If this proves to be the case, the surface of the conducting layer at which reflection takes place cannot be taken as horizontal. Mr. Eckersley is disposed to think that in many cases the reflection is of this kind. The influence of the layer in the daytime is less marked, as it extends down to the ground and produces absorption of the waves propagated through it. In the night it has a more or less sharp under-boundary, at which reflection can take place and the waves are confined almost entirely to the layer of air underneath.

THE February issue of *Radium* contains a report of the Leonard prize for research recently instituted by the American Röntgen Ray Society. The prize, which commemorates the name of Dr. C. Lester Leonard, a victim to X-rays, is for the best piece of original research in the field of X-rays, radium, or radio-activity, and is of the value of 1000 dollars. This competitive award is open to anyone living in the western hemisphere. In the same issue notice is given of a correspondence course in the physics of radio-activity suitable for the needs of biologists and surgeons as well as of physicists. The course is being arranged by Dr. N. E. Dorsey, of Washington, consultant to the National Bureau of Standards.

DR. C. E. K. MEES, director of the research laboratory of the Eastman Kodak Co., Rochester, N.Y., contributes to the Journal of the Franklin Institute of May 21 an excellent summary of the present knowledge of the structure and many of the properties of photographic films before and after use. Concerning the unexposed emulsion, the silver bromide particles are crystals belonging to the regular system. They show evidence of strain, perhaps because there is absorbed in them some other substance, such as silver iodide, soluble bromide, or gelatine. The sizes of the crystals are determined during the formation of the silver salt when making the emulsion, and their diameters range from ultra-microscopic particles below $0{\cdot}1\mu$ to occasional grains up to 10μ. The curve relating the sizes of grains to the number of each size present is probably closely related to the "characteristic curve" of the emulsion. Grains of the same size may vary in sensitiveness, and the sensitiveness of grains of different sizes in the same emulsion may vary from group to group. A geometric relation between the sensitiveness of grains of different sizes is sufficient to account for the properties of emulsions prepared in different ways. The author treats of the character of the developed image, and distinguishes between the graininess due to the individual particles of silver, the aggregations of these particles, and the agglomeration of these primary aggregations. The sharpness of the image is discussed, curves showing the quantitative values of these properties are given, and the methods by which these properties have been investigated are described.

YEAR BOOK No. 19 of the Carnegie Institution of Washington contains the nineteenth annual administrative report of the president, together with the reports on investigations and projects submitted by the various departments of the institution. Two sections of the presidential address, the financial records and the list of the institution's publications for the year, disclose some interesting facts. The total income available for the year ending October 31, 1920, was roughly 388,000*l.*, and of this sum about 278,000*l.* was allotted to the various departments. The Department of Terrestrial Magnetism received the biggest grant, some 51,000*l.*, while Mount Wilson Observatory received 45,000*l.*, and the Geophysical Laboratory the notable sum of 31,000*l.* Another large item in the expenditure was the production of the well-known publications of the Carnegie Institution, of which twenty-two were issued and a further eight authorised for publication during the course of the year; this work absorbed some 17,000*l.* The bulk of the Year Book is devoted to reports showing the progress of investigations carried on during the year; reports of directors of departments are given first, followed by reports of recipients of grants for other investigations, the latter being arranged according to subject.

THE latest catalogue (No. 415) of second-hand books offered for sale by Mr. F. Edwards, 83 High Street, Marylebone, W.1, deals with works relating to British and foreign birds, and natural history voyages and travels. It contains nearly 400 items, many formerly the property of the late Dr. F. du Cane Godman, and several choice and scarce works. It will appeal to ornithologists. The catalogue is to be obtained upon application.

Our Astronomical Column.

DR. HILL'S CUSPED ORBIT.—Dr. Hill in his "Researches on the Lunar Theory" described a certain case of satellite motion in which the orbit of the satellite relatively to the primary was cusped at first and last quarter. The period of such a satellite in the earth's case would be 205 days. Dr. Hill supposed that this was the orbit of maximum lunation, but M. Henri Poincaré later showed that still larger orbits were possible, with loops replacing the cusps.

Astr. Nach. No. 5101 contains a paper by Prof. T. J. J. See quoting results of the late Dr. John N. Stockwell, in which the latter claimed to have shown that Dr. Hill's cusped orbit was erroneous and should be replaced by a flattened oval with a period of lunation of 247⅔ days. He further asserted that Jacobi's integral (used by Dr. Hill) was based on incorrect mechanical principles. Both Prof. See and Dr. Stockwell appear to have overlooked a paper by R. Moritz in Mon. Not. R.A.S. for November, 1917, in which the latter re-investigated the cusped orbit of Dr. Hill by the method of mechanical quadratures used by Dr. P. H. Cowell for the eighth satellite of Jupiter and for Halley's comet. Needless to say, this method is independent of Jacobi's integral, and involves nothing beyond the elementary principles of accelerated motion. The result has led to the detection of a few unimportant numerical errors in Dr. Hill's work, but the accuracy of the cusped orbit is substantially verified. If Dr. Hill's figures had been rigorously exact, the minimum distance of the satellite from the earth would have been attained when the angle of motion relatively to the sun was exactly 90° from the cusp. The actual figures given by the quadrature method are 90° 6′ 51″. The error is mainly due to the small errata in Dr. Hill's work, though a little may be ascribed to the inevitable cumulative error of mechanical quadratures. It would therefore appear that Dr. Stockwell's method must involve some fallacy, since the orbit that he gives for a period of 208¾ days is of quite a different shape from the cusped orbit, and differs little from an ellipse.

STONYHURST COLLEGE OBSERVATORY.—We have received the annual report of this observatory from the director, the Rev. A. L. Cortie, S.J. The regular observation of the sun has been continued, and the results show a steady decline in spot-activity, the disc being without spots on four days in September last for the first time since 1916. The director communicated a paper to the British Association at Cardiff on the connection between faculæ and calcium flocculi, showing that the correlation of the two is so close that the faculæ are probably the bases of the flocculi.

It will be remembered that on a former occasion Father Cortie dwelt on the importance of the latitude of sun-spots as an index of their magnetic effect on the earth. This was borne out by the spot of last month, which, although not at all abnormal in its extent, passed very near the centre of the disc, producing great magnetic disturbance and extremely bright auroræ.

The report contains an obituary notice of Bro. W. McKeon, S.J., who died on May 18, 1920. He was on the observatory staff for forty-two years, the majority of the drawings of spots made at the observatory being his work.

"L'ASTRONOMIE ET LES ASTRONOMES."—M. Auguste Collard, librarian of the Royal Observatory of Belgium, has published a useful bibliography under this title, which forms a brochure of 119 pages. It is divided under the headings: (1) Dictionaries and Encyclopædias of Astronomy; (2) Biographies of Astronomers; (3) Treatises on Astronomy, subdivided into many sections; (4) Histories; (5) Bibliographies; (6) Atlases; (7) Reviews; and (8) Tables.

The works under the various headings are not arranged in alphabetical order, but there are alphabetical indices at the end. There are also in many cases brief notes summarising the scope of the work, which are a useful supplement to the mere statement of the author's name and the title. The book promises to be useful; it is one of a series of similar works of reference published by G. Van Oest et Cie, National Library of Art and History, Brussels.